

Separation of CdTe and CdS Films from PV Modules

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This work investigates the electrochemical process parameters for dissolution and re-deposition of the CdS/CdTe cell components, as needed to devise a viable module recycling system. Voltammetric and surface analytical methods are used to elucidate the reaction mechanisms, specifically focusing on separating the CdS from CdTe without cross contamination. Although the CdTe and CdS films co-deposit in the same potential region, a judicious selection of process parameters allows the retrieval of S-free CdTe films on a new glass/SnO₂/CdS panel. The results lead to a closed-loop recycling system to disassemble modules, dissolve semiconductors, retrieve CdTe and CdS precursors. The same system may be used for in-situ analysis and purification of the electrolyte for re-use. The closed-loop electrochemical approach may be used to rapidly convert defective or spent modules into efficient devices.